Neurological System Examination

2nd Year Medicine / 3rd Year Dentistry Clinical Skills Programme
Resources

http://www.medicine.tcd.ie/clinical-skills/
Approaching The Patient

- Wash your hands
- Be friendly & smile
- Introduce yourself clearly & simply
- Confirm the patient’s details and ask how they would like to be addressed
- Explain that you would like to write a few things down to help you remember the facts
Gloves should be worn only when:

- Examining an individual with exudative lesions or weeping dermatitis
- When handling blood-soiled or body fluid-soiled sheets or clothing
- Use common sense about when it is appropriate to wear gloves!
Preparation of the patient

• Have the patient lie or sit in a comfortable position
• Before the examination, ask the patient to identify any painful areas
• During the examination pay attention to their facial expression to assess for signs of discomfort
General Examination

• Before doing a focussed examination of the neurological system a general examination relevant to the neurological system should be performed:

General Inspection

Observe for:
- Level of consciousness
- Facial asymmetry
- Drooling
- Obvious limb weakness
- Muscle wasting
- Tremor
- Neck stiffness

Inspection Around The Bed

Observe for:
- Walking sticks or frames
- Food thickeners
- Glasses
- IV cannulas
- NG tube or PEG tube
- Catheter bag
Neurological Examination

• The neurological examination has many aspects and knowing your neuroanatomy is very helpful when interpreting the significance of different findings

• Domains of the neurological examination include;
  
• **Higher Centres and Speech**: Handedness, orientation, speech, frontal/parietal/temporal lobe

• **Cranial Nerves**: Cranial nerves I - XII

• **Upper and Lower Limbs**: Tone, power, reflexes, coordination, sensation

• **Gait**

• **Cerebellum**: PINARDS past-pointing, intention tremor, nystagmus, ataxia, rebound, dysdiadochokinesis, speech (slurred or staccato speech)
Higher Centres and Speech

• Ask the patient if they are **right or left handed**: indication about which hemisphere is likely to be dominant

• **Orientation**: Ask the patient their full name, where they are and the current date (cover front of the newspaper!)

• **Speech**: Note any dysarthria, dysphonia or dysphasia
  
  • Ask the patient to:
    
    • Describe 2-3 objects e.g. a watch and a pen (nominal)
    
    • Follow a 3-step command e.g. take this page, fold it in half and place it on the table using your left hand (receptive)

    • Repeat a phrase e.g. no ifs, ands or buts (conductive)

• Assessment of frontal, temporal and parietal lobes not routine
Cranial Nerves

**POSITION:** Sit over the edge of the bed

**INSPECTION:** Asymmetry, unequal pupils, ptosis, scars

**CRANIAL NERVE I = Olfactory nerve**

- Test the patient’s sense of smell using coffee or peppermint

**CRANIAL NERVE II = Optic Nerve**

- Visual acuity: using a Snellen chart assess acuity in each eye
- Visual fields: using a red-tipped hat pin map out visual fields and blind spot
- Fundoscopy: visualise cornea, iris, lens and fundus
Cranial Nerves

CRANIAL NERVES III, IV and VI = Oculomotor, Trochlear and Abducens

• III Oculomotor:
  • Pupil size, shape and regularity
  • Light reflex and relative afferent pupillary defect (pen torch)
  • Accommodation

• III, IV and VI = Oculomotor, Trochlear and Abducens:
  • Abnormal eye movements (smooth pursuits, saccades, nystagmus)
  • Double vision
  • Convergence
  • Oculocephalic (doll’s eye) reflex
Oculomotor, Trochlear and Abducens

**SO4, LR6**
CN4 lesion: weakness of down and out movement
CN6 lesion: Failure of lateral movement, convergent strabismus and diplopia

**Superior Rectus**
III (oculomotor)

**Superior Oblique**
IV (trochlear)

**Medial Rectus**
III (oculomotor)

**Inferior Rectus**
III (oculomotor)

**Inferior Oblique**
III (oculomotor)

**Lateral Rectus**
VI (abducens)
Cranial Nerves

CRANIAL NERVE V = Trigeminal nerve

- Sensation (pain and light touch) over 3 divisions of the nerve
- Motor function (masseter = clench teeth and pterygoids = hold mouth open against resistance)
- Jaw jerk
- Corneal reflex is uncomfortable so not routinely performed

CRANIAL NERVE VII = Facial nerve

- Facial asymmetry
- Power of muscles of facial expression
  - Wrinkle forehead puff out cheeks, shut eyes tightly
- Taste on anterior 2/3 of tongue
Cranial Nerves

CRANIAL NERVE VIII = Vestibulocochlear nerve

• Inspect pinna and external auditory meatus
• Use otoscope to assess tympanic membrane
• Assess hearing
  • Whisper numbers, Rinné’s test, Weber’s test
• Hallpike manoeuvre may be performed if patient complains of vertigo
Cranial Nerves

CRANIAL NERVE IX and X = Glossopharyngeal and Vagus nerve
- Hoarseness, bovine cough, swallow
- Deviation of the uvula, gag reflex or sensation of pharynx (reflex contraction should be observed)
- Taste of posterior 1/3 of tongue (not routinely tested)

CRANIAL NERVE XI = Accessory Nerve
- Shrug shoulders and turn head to side against resistance

CRANIAL NERVE XII = Hypoglossal Nerve
- Look for tongue wasting and fasciculations. Ask patient to stick out their tongue
Upper & Lower Limb

For examination of the upper and lower limbs use GETPRICES:

- General inspection/Gait
- Tone
- Power
- Reflexes
- Coordination
- Sensation
Upper Limb

General Inspection

- Look for muscle wasting
- Fasciculations
- Scars
- Contractures

Tone

- Ask the patient if they are in any pain
- Move the limb and assess tone across two joints simultaneously
- Compare each side
Upper Limb

Power

- Power is graded out of 5
- Shoulder abduction and adduction
- Elbow flexion and extension
- Wrist flexion and extension
- Finger flexion, extension, abduction and adduction

Power grades:
- 5/5 = Normal power
- 4/5 = Movement against some resistance but not normal
- 3/5 = Movement against gravity but not against resistance
- 2/5 = Movement possible but not against gravity e.g. side to side on bed
- 1/5 = Flicker of movement only
- 0/5 = Complete paralysis

Reflexes

- Biceps
- Triceps
- Brachioradialis
- Finger-jerks

Reflex Grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Absent</td>
</tr>
<tr>
<td>+</td>
<td>Present but reduced</td>
</tr>
<tr>
<td>++</td>
<td>Normal</td>
</tr>
<tr>
<td>+++</td>
<td>Increased, possibly normal</td>
</tr>
<tr>
<td>++++</td>
<td>Greatly increased ± clonus</td>
</tr>
</tbody>
</table>
Upper Limb

Coordination

- Finger-nose test
- Dysdiadochokinesis
- Rebound

Sensation

- Spinothalamic pathway
  - Pain using a neurotip
  - Temperature (not routine)
- Posterior Column
  - Light touch using cotton wool
  - Vibration sense using a 128 Hz tuning fork
  - Proprioception = joint position
Lower Limb

General Inspection

- Look for muscle wasting
- Fasciculations
- Scars
- Contractures

Gait

- Ask the patient to walk forwards and backwards
- Assess heel-toe gait
- Ask patient to walk on toes (S1) and on heels (L4/L5)
- Squat and stand to test for proximal myopathy
- Romberg = stand with feet together and eyes open, then close eyes and see if patient becomes more unsteady
Lower Limb

Tone

• Ask the patient if they are in any pain
• Move the limb and assess tone across two joints simultaneously
• Compare each side
• Test for clonus = rhythmical plantar flexion movement when foot is rapidly dorsiflexed.

Power

• Hip flexion, extension, abduction and adduction
• Knee flexion and extension
• Plantar flexion, dorsiflexion
• Ankle eversion and inversion
Lower Limb

Reflexes

- Knee jerk
- Ankle jerk
- Plantar reflex

Coordination

- Heel-shin test
- Toe-finger test
- Foot tapping test
Lower Limb

Sensation

- Spinothalamic pathway
  - Pain using a neurotip
  - Temperature (not routine)
- Posterior Column
  - Light touch using cotton wool
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Cerebellum

PINARDS

- Past-pointing
- Intention tremor
- Nystagmus
- Ataxia
- Rebound
- Dysdiadochokinesis
- Scanning or staccato speech
Thank You